**Probability rules worksheet #2 NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. If P(A) = 0.48 and P(B) = 0.67 and P(A∩B) = 0.22, find the following:
   1. P(A U B) =
   2. P(A U BC) =
   3. P(AC ∩ B) =
   4. P(B|A) =
   5. P(AC|BC) =
   6. Are A and B disjoint events? Why or why not?
   7. Are A and B independent events? Why or why not?
2. If P(G) = 0.18, P(M) = 0.24 and G and M are independent, what’s the probability of G and M?
3. If P(W) = 0.61 and P(J) = 0.45 and P(J|W) = 0.2, find the following:
4. P(W and J) =
5. P(W or J) =
6. If P(D) = 0.48, P(R) = 0.25 and D and R are disjoint, what is the probability of D or R?

1. Suppose in a library 23% of the books are children’s books, 42% of the books are adult fiction, and the rest are non-fiction.
2. What is the probability that a randomly selected book is:
3. Non-fiction
4. Not a children’s book
5. A children’s book or an adult fiction
6. If the type of book is independent of the next what is the probability that:
7. 2 randomly selected books are both children’s books?
8. 2 randomly selected books are fiction then non-fiction?
9. 2 randomly selected books are children’s and adult fiction?
10. 2 randomly selected books are not adult fiction?
11. At least 1 out of 4 randomly selected books is a children’s book?
12. The first non-fiction book is the 5th one selected?
13. In a large university 13.5% of the students take economics, 24.7% of the students take statistics, and 11.7% take economics and statistics.
14. Draw a Venn Diagram
15. What is the probability that a randomly selected student:
16. Took economics or statistics?
17. Didn’t take economics but did take statistics?
18. Didn’t take economics or didn’t take statistics?
19. That took statistics didn’t take economics?
20. Didn’t take statistics given they took economics?
21. Is taking statistics and economics mutually exclusive? independent?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Frequently | Occasionally | Not at all | Total |
| Male | 221 | 456 | 795 | 1472 |
| Female | 207 | 430 | 741 | 1378 |
| Total | 428 | 886 | 1536 | 2850 |

1. The following table shows the results of survey that asked people whether they were involved in any type of charity work.

What is the probability that

1. a randomly selected person is male and frequently involved in charity work?
2. a randomly selected person is male or occasionally involved in charity work?
3. a randomly selected person is female or not involved in charity work?
4. a randomly selected person is male given they frequently involved in charity work?
5. a randomly selected female is occasionally involved in charity work?
6. a person not involved in charity is female?
7. Is sex and involvement in charity independent? Disjoint?

**Probability rules worksheet #2 NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. If P(A) = 0.48 and P(B) = 0.67 and P(A∩B) = 0.22, find the following:

.22

.26

.45

.07

A

B

1. P(A U B) = 0.93
2. P(A U BC) = 0.55
3. P(AC ∩ B) = 0.45
4. P(B|A) = 
5. P(AC|BC) = 
6. Are A and B disjoint events? Why or why not?

Not disjoint. P(A∩B) = 

1. Are A and B independent events? Why or why not?

Not independent. P(B|A) = 0.4583 ≠ P(B) = 0.67

1. If P(G) = 0.18, P(M) = 0.24 and G and M are independent, what’s the probability of G and M?

P(G∩M) = 0.18 \* 0.24 = 0.0432

1. If P(W) = 0.61 and P(J) = 0.45 and P(J|W) = 0.2, find the following:
2. P(W and J) = 0.61 \* 0.2 = 0.122
3. P(W or J) = 0.61 + 0.45 – 0.122 = 0.938
4. If P(D) = 0.48, P(R) = 0.25 and D and R are disjoint, what is the probability of D or R?

P(D U R) = 0.73

1. Suppose in a library 23% of the books are children’s books, 42% of the books are adult fiction, and the rest are non-fiction.
2. What is the probability that a randomly selected book is:
3. Non-fiction

P(NF) = 0.35

1. Not a children’s book

P(CC) = 0.77

1. A children’s book or an adult fiction

P(C U AF) = 0.65

1. If the type of book is independent of the next what is the probability that:
2. 2 randomly selected books are both children’s books?

P(C ∩ C) = 0.23 \* 0.23 = 0.0529

1. 2 randomly selected books are fiction then non-fiction?

P(AF ∩ NF) = 0.42 \* 0.35 = 0.147

1. 2 randomly selected books are children’s and adult fiction?

P(C ∩ AF) = 2(0.23)(0.42) = 0.1932

1. 2 randomly selected books are not adult fiction?

P(AFC ∩ AFC) = (0.58)(0.58) = 0.3364

1. At least 1 out of 4 randomly selected books is a children’s book?

P(at least 1 C) = 1 – P(CC ∩ CC ∩ CC ∩ CC) = 1 – (0.77)4 = 0.6485

1. The first non-fiction book is the 5th one selected?

P(NFC ∩ NFC ∩ NFC ∩ NFC ∩ NF) = (0.65)4(0.35) = 0.0625

1. In a large university 13.5% of the students take economics, 24.7% of the

.117

.018

.130

.735

E

S

students take statistics, and 11.7% take economics and statistics.

1. Draw a Venn Diagram
2. What is the probability that a randomly selected student:
3. Took economics or statistics?

P(E U S) = 0.265

1. Didn’t take economics but did take statistics?

P(EC ∩ S) = 0.130

1. Didn’t take economics or didn’t take statistics?

P(EC U SC) = 0.883

1. That took statistics didn’t take economics?

P(EC|S) = 

1. Didn’t take statistics given they took economics?

P(SC|E) = 

1. Is taking statistics and economics mutually exclusive? independent?

Not mutually e

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Frequently | Occasionally | Not at all | Total |
| Male | 221 | 456 | 795 | 1472 |
| Female | 207 | 430 | 741 | 1378 |
| Total | 428 | 886 | 1536 | 2850 |

1. The following table shows the results of survey that asked people whether they were involved in any type of charity work.

What is the probability that

1. a randomly selected person is male and frequently involved in charity work?

P(M ∩ Fr) = 

1. a randomly selected person is male or occasionally involved in charity work?

P(M U O) = 

1. a randomly selected person is female or not involved in charity work?

P(F U N) = 

1. a randomly selected person is male given they frequently involved in charity work?

P(M|Fr) = 

1. a randomly selected female is occasionally involved in charity work?

P(O|F) = 

1. a person not involved in charity is female?

P(F|N) = 

1. Is sex and involvement in charity independent? Disjoint?

They are independent. P(F|N) = 0.4824 = P(F) = 0.4835

They are not disjoint. P(M ∩ Fr) = 0.0775 ≠ 0